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Class. CHANGED TO: TS S C

DDA Memo, 4 Apr 77

Auth: DDA REG. 77/1763

Date: 050478 By: 025

CENTRAL INTELLIGENCE GROUP

INTELLIGENCE REPORT

COUNTRY China

DATE:

SUBJECT Economic Information: Oil, Manchuria

INFO. 22 August 1946

DIST. 23 December 1946

25X1A6a

PAGES 3

ORIGIN

25X1X6

SUPPLEMENT

1. Oil Shale in Manchuria

Oil shale was discovered first in the Fushun (123-54, 41-53) coal fields in 1911. Since that time much low-percent oil shale has been found in Manchuria, but with the exception of that in Fushun, which lies below the coal-bearing strata, none of it is being processed. Geologically, oil shale is classified according to the age to which it belongs, as follows:

a. Lower Jurassic or Upper Triassic

This shale exists in small quantities at Chiufotang (119-41, 40-58), K'ouhuolin (口火麟), and T'iaoerhou (跳兒溝), near Chaoyang (120-26, 41-34). Its petroleum percentage is only 2 - 1%.

b. Upper Jurassic

The shales of this geological age are always accompanied by coal-bearing strata, of which they usually form the lower layer. Most of the shale in Manchuria belongs to this age, and although the amount is estimated at 200,000,000 tons, the percentage of petroleum is only 2 - 5%. It is found in the following areas:

- (1) Ch'ingch'uantzu (清泉水), Tamiao (大廟), and Chifenghsien in Jehol.
- (2) *Tap'ingfang (太平房), Yuehvaokou, (月華溝), Fuchiakou (卜家溝)
- **Yuehchienyo (月見丘) near Chaoyang. */Taipingfang, 120-08, 41-25?7
- (3) Hsingching (125-02, 41-42). **Yuehchlenchiu?
- (4) The Argun River area, Heilungkiang Province. (China Headquarters Note: This river runs west from Hailar and then north to form the northwest boundary of Manchuria.)

c. Lower Cretaceous

(1) South of Yanchi (129-31, 42-55) near the village of Talatan (大拉子) Lotzoukou (羅子溝) there are important oil shale layers containing 5 - 20% petroleum. Japanese geologists estimated that this area contains 200,000 tons of it. The Manchoukuo Government intended to establish a small company there, but the necessary equipment was lacking.

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(2) In the Tungning (131-14, 44-01) district, oil shale is so mixed with coal that the two cannot be separated. Source believes that this coal might be suitable for distillation purposes.

(3) The famous Fushun coal field produces an estimated 800,000,000 tons of oil shale which has an oil percentage of 8 - 12%. From 1911 until recently the Japanese Government obtained from it large quantities of oil for airplane use and relied upon it for artificial oil. In 1944 this government increased the facilities and equipment of the Fushun Oil Factory by fifty percent. Source has heard that this factory was damaged by fire during the war and that the Soviet Army removed many instruments and much equipment, but these reports are unconfirmed. In any case, it is not now operating. The coal field is producing 4,000 tons of coal a month.

d. Unclassified

Formerly the oil shale found in the Huatien (126-45, 42-58) district was thought to belong to the Upper Jurassic age, as was the coal. In 1944, however, tertiary fossils and other unconformities were found in the shale. The amount of this shale is estimated at 12,000,000 tons; the average petroleum percentage is 20%. The Manchukuo Government set up several small factories in this district and obtained some petroleum by the same process as the one used at Fushun.

2. Petroleum in Manchuria

a. Chalainor District

In the area between the northern coast of Chalainor Lake ((117-27, 49-00), properly known as Ta-lai Lake or Hu-lun Chih, and Chalainor Station, it was accidentally discovered that the pitch-like matter in the porous basaltic gravels would burn. A Russian named E. Aruteifu (Arutev?) (Japanese romanization of アルティフ), took some of this pitch to the Manchurian Railway Company to be analyzed. In 1924, Mr. Trich, an American, tried unsuccessfully to establish a company in this district. In 1930 and 1931 two more attempts at surveys were made by the Manchurian railway and the Chinese geologist HOU Te-feng, but both failed because of interference by bandits. In 1933 Japanese geologists under the protection of the Japanese Army made a survey which showed that Chalainor pitch is derived from petroleum and not from coal. The Manchurian Oil Company then drilled more than sixty wells, several of which yielded asphalt and crude petroleum. From surface-surveying and boring it was assumed that the origin of this petroleum was closely concerned with the NW-Fault and a NE-Fault, which cut the NW-Fault. In spite of the fact that several wells were drilled to a depth of more than 2,000 meters, the oil-bearing under-layer of trachytic rock was not found. The Manchurian Oil Company halted its operations in this field in 1935 and moved most of its equipment to the Fushun oil field. The surface soil of the Chalainor district is very deep, so that it is difficult to determine the underground structure by surface-surveying only. Since 1935 three surveys have been made, but the anticlinal structure and rock-salt domes which characterize oil-bearing structures have not been found. In this district Sandin-Trachyte rock is widely distributed, overlaid by Mesozoic or perhaps upper Jurassic coal bearings. Near the northwest coast of Chalainor Lake, Sandin-Trachyte is very porous and contains a great deal of natural pitch.

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b. Fushun Oil Field

After the beginning of the Sino-Japanese War, bituminous matter was discovered in the Fushun coal field at Hsiench'ang (縣城), T'uhulu (吐呼魯), and Tungkang (東崗). After the survey of 1939, a large anticlinal structure was found in the Tongan district, and although subsequent drilling was extensive, only approximately 180 liters of oil were obtained. While a quantity of petroleum has been produced from many other wells, the yield at Fushun has never paid for the cost of production, and during the war almost all of its boring machines were sent to Java, Borneo, and elsewhere. The Japanese Government did not obtain any petroleum from Manchuria except that from the oil shale at Fushun.

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